IN THE CLAIMS:

1. (Currently Amended) A method for processing a specimen using a plasma, comprising:

generating a plasma in a processing chamber in which the specimen is disposed; and

processing the specimen with the plasma generated in the processing chamber, wherein

the processing of the specimen comprises:

an irradiation operation for projecting and scanning a light beam into the processing chamber through an observation window of the processing chamber;

a detection operation for detecting a light of the projected light beam which is reflected from an inside wall of the processing chamber, the light being detected by separating a light component from light emanated from the plasma and light reflected from the inside wall by use of a spectroscope; and

a signal processing operation for obtaining information on a state of contamination of the inside wall of the processing chamber, by processing a signal obtained at the detection operation by referring to a database storing predetermined relationships between ~~a signal~~ signals obtained from said detection of light from said inside wall and ~~a state~~ states of contamination of said inside wall.

2. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, comprising

a control operation for controlling the plasma processing of the specimen, based on the information on the state of contamination of the inside wall obtained at the signal processing operation.

3. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, wherein at the detection operation, a specular reflection component of the reflected light from the inside wall of the processing chamber is formed by an imaging optical system, and detected by a detector.

4. (Previously Presented) A method for processing a specimen using a plasma according to Claim 3, wherein at the detection operation, when the specular reflection component of the reflected light is formed by an imaging optical system through the observation window and detected by a detector, a light generated from the plasma in the processing chamber is cut off by a filter.

5. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, wherein at the irradiation operation, when the beam is projected into the inside of the processing chamber and scanned so as to be projected onto a plurality of locations on the inside wall of the processing chamber.

6. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, wherein projecting the light beam into the inside of the processing chamber at the irradiation operation and detecting the reflected light at the detection operation are conducted through the same observation window.

7. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, wherein at the detection operation, the reflected light from the inside wall of the processing chamber varies in accordance with a variation in the state of irregularity of the inside wall of the processing chamber.

8. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, wherein at the irradiation operation, intensity of the light beam is modulated by a desired frequency and the light beam is projected into the inside of the processing chamber through the observation window.

9. (Previously Presented) A method for processing a specimen using a plasma according to Claim 8, wherein at the signal processing operation, information on the state of contamination of the inside wall of the processing chamber is obtained by extracting a light component which has a frequency which is the same as the desired frequency utilized for modulation.

10. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, wherein at the detection operation, a light image limited by a diaphragm placed at an imaging position of the imaging optical system is received by a detector.

11. (Previously Presented) A method for processing a specimen using a plasma according to Claim 1, wherein at the irradiation operation, the light beam to

be projected into the inside of the processing chamber has a desired wavelength component, and at the detection operation, the desired wavelength component is separated from the reflected light.

12. (Currently Amended) A method for processing a specimen using a plasma, comprising:

generating a plasma in a processing chamber in which a specimen is disposed;

processing the specimen with the plasma generated in the processing chamber;

wherein the processing of the specimen comprises:

projecting a light beam into the inside of the processing chamber through an observation window;

splitting light reflected from the inside of the processing chamber in response to the projected light beam and passed through the observation window into at least two components;

obtaining information on suspended foreign material in the processing chamber by detecting a first one of the components of the split light ~~through an~~ using a first optical unit ~~which is in a predetermined relation of imaging~~ arranged to detect light with respect to predetermined positions within a volume of said plasma; and

obtaining information on a state of contamination of an inside wall of the processing chamber by detecting a second one of the components of the split light ~~through an~~ using a second optical unit ~~which is in a predetermined relation of~~

~~imaging~~ arranged to detect light with respect to predetermined positions on said inside wall.

13. (Currently Amended) A method for processing a specimen using a plasma according to Claim 12, comprising controlling the plasma processing of the specimen, based on information on the suspended foreign material in the processing chamber as obtained by the first optical unit, and based on information on the state of contamination of the inside wall of the processing chamber as obtained by the second optical unit.

14. (Currently Amended) A method for processing a specimen using a plasma according to Claim 12, wherein ~~at~~ in the projecting, ~~operation,~~ the light beam intensity of the light beam is modulated by a desired frequency and the light beam is projected into the inside of the processing chamber.

15. (Currently Amended) A method for processing a specimen using a plasma according to Claim 14, wherein ~~at~~ the obtaining ~~operation,~~ information on the suspended foreign material in the processing chamber is obtained by extracting a light component ~~which has a frequency which is the same as the desired utilized for modulation frequency~~ of a desired frequency from the first one of the components of the split light.

16. (Currently Amended) A method for processing a specimen using a plasma according to Claim 14, wherein ~~at~~ the obtaining ~~operation,~~ information on the

state of contamination of the inside wall of the processing chamber is obtained by extracting a light component of a desired frequency from the second one of the components of the split light.

17. (Currently Amended) A method for processing a specimen using a plasma according to Claim 12, wherein both of the light beam ~~to be~~ projected into the inside of the processing chamber, ~~at the projection operation,~~ and the light reflected ~~light~~ from the inside of the processing chamber, ~~at the splitting of the reflected light,~~ pass through the same observation window.

18. (Previously Presented) A method for processing a specimen using a plasma according to Claim 12, wherein at the obtaining of the information on the state of contamination of the inside wall of the processing chamber by detecting the second one of the components of the split light, a scattered reflected light component from the inside wall of the processing chamber is cut off by a spatial filter.

19. - 35. (Canceled)

36. (New) A method for processing a specimen using a plasma, comprising:

generating a plasma in a processing chamber in which the specimen is disposed; and

processing the specimen with the plasma generated in the processing chamber, wherein

the processing of the specimen comprises:

an irradiation operation for projecting and scanning a light beam into the processing chamber through an observation window of the processing chamber;

a detection operation for detecting a light of the projected light beam which is reflected from an inside wall of the processing chamber, the light being detected by separating a light component from light emanated from the plasma and light reflected from the inside wall by use of a spectroscope; and

a signal processing operation for obtaining information on a state of contamination of the inside wall of the processing chamber, by processing a signal obtained at the detection operation by referring to a database means for storing predetermined relationships between signals obtained from said detection of light from said inside wall and states of contamination of said inside wall.

37. (New) A method for processing a specimen using a plasma according to Claim 36, comprising

a control operation for controlling the plasma processing of the specimen, based on the information on the state of contamination of the inside wall obtained at the signal processing operation.

38. (New) A method for processing a specimen using a plasma according to Claim 36, wherein at the detection operation, a specular reflection component of the reflected light from the inside wall of the processing chamber is formed by an imaging optical system, and detected by a detector.

39. (New) A method for processing a specimen using a plasma according to Claim 38, wherein at the detection operation, when the specular reflection component of the reflected light is formed by an imaging optical system through the observation window and detected by a detector, a light generated from the plasma in the processing chamber is cut off by a filter.

40. (New) A method for processing a specimen using a plasma according to Claim 36, wherein at the irradiation operation, when the beam is projected into the inside of the processing chamber and scanned so as to be projected onto a plurality of locations on the inside wall of the processing chamber.

41. (New) A method for processing a specimen using a plasma according to Claim 36, wherein projecting the light beam into the inside of the processing chamber at the irradiation operation and detecting the reflected light at the detection operation are conducted through the same observation window.

42. (New) A method for processing a specimen using a plasma according to Claim 36, wherein at the detection operation, the reflected light from the inside wall of the processing chamber varies in accordance with a variation in the state of irregularity of the inside wall of the processing chamber.

43. (New) A method for processing a specimen using a plasma according to Claim 36, wherein at the irradiation operation, intensity of the light beam is

modulated by a desired frequency and the light beam is projected into the inside of the processing chamber through the observation window.

44. (New) A method for processing a specimen using a plasma according to Claim 43, wherein at the signal processing operation, information on the state of contamination of the inside wall of the processing chamber is obtained by extracting a light component which has a frequency which is the same as the desired frequency utilized for modulation.

45. (New) A method for processing a specimen using a plasma according to Claim 36, wherein at the detection operation, a light image limited by a diaphragm placed at an imaging position of the imaging optical system is received by a detector.

46. (New) A method for processing a specimen using a plasma according to Claim 36, wherein at the irradiation operation, the light beam to be projected into the inside of the processing chamber has a desired wavelength component, and at the detection operation, the desired wavelength component is separated from the reflected light.